

## INTISARI

Kabupaten Banjarnegara merupakan daerah rawan bencana longsor. Berdasarkan data BNPB selama tahun 2019, di Kabupaten Banjarnegara telah terjadi 32 kejadian bencana, dengan rincian 29 kejadian tanah longsor. Salah satu riwayat kejadian longsor di Kabupaten Banjarnegara yaitu longsor di Desa Clapar pada tanggal 24 dan 29 Maret 2016. Potensi pergerakan masih dapat terjadi di wilayah longsor karena terdapat beberapa wilayah inisiasi longsor yang masih aktif. Kondisi tersebut perlu dikaji karena lahan bekas longsor dimanfaatkan kembali oleh penduduk sebagai kebun campuran dan tegalan. Identifikasi karakteristik tanah dan pemetaan kerawanan longsor perlu dilakukan untuk mengetahui faktor keamanan di wilayah longsor Desa Clapar. Tujuan penelitian dilakukan untuk mengidentifikasi karakteristik tanah secara fisik, kimia lempung, dan mekanis di wilayah longsor Clapar serta menganalisis kondisi kerawanan longsor Clapar berdasarkan identifikasi faktor keamanan menggunakan SIG berbasis *infinite slope model*.

Data penelitian yang dibutuhkan terdiri dari data sekunder mengenai curah hujan, kemiringan lereng, dan kondisi wilayah longsor. Data primer terdiri dari sampel tanah terusik, sampel tanah tak terusik, tebal tanah, dan kondisi aktual wilayah longsor. Karakteristik tanah secara fisik diidentifikasi dengan pengujian laboratorium dan karakteristik mekanik diuji menggunakan triaksial terkonsolidasi tak terdrainase, sedangkan karakteristik kimia lempung diuji dengan metode XRF, XRD, dan SEM. Analisis kerawanan longsor dilakukan menggunakan formula *infinite slope model* untuk menentukan faktor keamanan. Formula *infinite slope model* menggunakan 7 parameter yaitu kemiringan lereng, tebal tanah, berat volume tanah, berat volume air, kohesi tanah, sudut geser dalam, dan derajat kejenuhan tanah. Skenario pemetaan yang dilakukan terdiri dari kondisi tanah tidak jenuh air, setengah jenuh, dan jenuh total.

Hasil penelitian mengenai identifikasi karakteristik tanah secara umum di wilayah kajian memiliki karakteristik fisik yaitu ukuran butir yang didominasi lanau, sehingga berpengaruh pada tesktur tanah yang didominasi lanau. Tekstur tanah berpengaruh pada porositas tanah yang kurang baik hingga jelek dengan derajat kejenuhan yang menunjukkan kondisi tanah yang lembab dan basah. Analisis kimia lempung menghasilkan jenis mineral lempung yang dominan yaitu illite. Identifikasi sifat mekanis tanah menggunakan pengujian kuat geser triaksial terkonsolidasi tak terdrainase menunjukkan karakteristik tanah lempung sebagai bidang gelincir longsor yang dapat diklasifikasikan dalam tanah ekspansif yang memiliki potensi gerakan tanah sedang hingga tinggi. Hasil identifikasi faktor keamanan menggunakan 3 skenario derajat kejenuhan tanah menunjukkan kesamaan wilayah yang memiliki kerawanan longsor tinggi yang berpotensi menjadi wilayah inisiasi longsor, yaitu di mahkota longsor pertama dan kaki longsor pertama yang sebagian berubah menjadi mahkota longsor kedua. Berdasarkan identifikasi faktor keamanan longsor, penyebab longsor di Desa Clapar yaitu kemiringan lereng, tebal tanah, kohesi, dan sudut geser dalam, sedangkan faktor pemicu longsor yaitu derajat kejenuhan tanah.

**Kata kunci: identifikasi, karakteristik tanah, faktor keamanan longsor, kerawanan longsor**

## ABSTRACT

*Banjarnegara regency is one of the areas that have the potential of landslides. Based on National Disaster Management Authority's (Badan Nasional Penanggulangan Bencana) data in 2019, 32 catastrophic events had occurred in Banjarnegara, that 29 incidents of them are landslides. One of Banjarnegara district that have history of landslide is Clapar village which happened on March 24 and 29, 2016. Potential movement still can occur in former landslides because there are several active landslide. These conditions need to be examined as the dormant landslide is reused by residents as mixed farming and dry farming. Identification of soil characteristics and the mapping of landslide susceptibility should be conducted to know the security factor of landslide in Clapar village. This research intends to identify the physical, chemical and mechanical soil characteristics of the Clapar's landslide and analyse the Clapar's landslide susceptibility condition based on the safety factor analysis using infinite GIS based on slope model.*

*The data in this research are primary and secondary data. Secondary data consists of rainfall, slope, and landslide conditions, whereas the primary data consist of disturbed soil samples, undisturbed soil samples, soil thickness, and the actual condition of the landslide area. Physical characteristics were identified by laboratory testing and mechanical soil characteristics were identified using triaxial test consolidated undrained, while chemical characteristics of clay were tested by XRF, XRD, and SEM. Landslide susceptibility is analysed using the infinite slope model formula to determine safety factors. The infinite slope model formula uses 7 parameters namely slope, soil thickness, soil volume weight, water volume weight, soil cohesion, effective angle of shearing resistance, and degree of soil saturation. Mapping scenario of landslide susceptibility using soil saturation degree is totally saturated, half saturated, and unsaturated.*

*The results of the study of soil characteristics in general in the study area consist of land derived from volcanic material, and soil derived from claystone. Physical characteristic identified from the size of grain is dominated by silt, so it will influence on soil texture which is dominated by silt. Soil texture affects the porosity of the soil that is not good to the bad with a degree of saturation indicating moist and wet soil conditions. Chemical analysis of the clay produces the dominant type of clay minerals are illite. Identification of the mechanical properties of the soil using triaxial consolidated undrained exhibit characteristics volcanic soil and clay that experience the potential of high wrinkles that it can be classified in soil with the potential for moderate to high ground movements. The results of safety factor identification using three scenario of soil saturation degree is the first avalanche which partially transforms into a second landslide crown degree the similarity of areas that have a high landslide susceptibility that could potentially become a landslide initiation area, i.e. in the first landslide crown. Based on the identification of landslide safety factors, the causes of landslides in Clapar Village are slope, soil thickness, cohesion, effective angle of shearing resistance, while the trigger factor for landslides is the degree of soil saturation.*

**Keywords:** *identification, soil characteristics, safety factor of landslides, landslide susceptibility*